

BIG TREES OF THE SOUTHERN ILLINOIS CACHE RIVER BOTTOMS

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Some of the largest swamp trees in the United States occur in and along the shallow floodplains of the lower Cache River near the Village of Karnak in southern Illinois. Though the existence of these big trees has long been known and appreciated by the local residents of the area, few of these ancient plants have served as the object of scientific measurement, description, and study. And yet, there would appear to be much to be learned from a detailed analysis of the ecology, growth patterns, and distribution of these venerable giants of the forest, and especially so as the information gleaned from such studies may be useful in the resolution of problems relating to their current preservation. To this latter end, in particular, the following remarks are directed.

Dominating the landscape of southern Illinois are its extensive river systems. One such system, the Cache, which winds through five southern counties before finally finding entrance into the Mississippi River some ten miles north of the city of Cairo, drains a portion of the state long known affectionately to its local residents as the "land between the rivers." This folk name for the area derives from the fact that the two very largest rivers of the area, the Ohio and the Mississippi, prior to becoming confluent south of Cairo, converge abruptly to form the eastern and western boundaries of the state. The land thus enclosed on three sides by these large rivers forms a distinct geographic province within the state, this characterized by a culture and a set of traditions which are more in keeping with those of the deep south than they are of the north (Horrell, Piper & Voigt, 1973).

Floristically, the area encompassed by the extreme southern tip of Illinois may be categorized as a northward extension of the Coastal Plain (Vestal, 1931; Braun, 1950). Cypress-tupelo swamp was at one time the dominant vegetation of this area. Today, however, only remnants of this once widespread formation exist in southern Illinois, this due to the extensive logging of the area, and the subsequent drainage of the land for agriculture.

Though there are many places in southern Illinois where good examples of second growth cypress-tupelo swamp can be seen today, the finest and least disturbed stands of this wetland association, if not to be described as primeval, occur in the vicinity of the small rural community of Karnak in northeastern Pulaski County. In this area, the Cache River, prior to its damming, straightening, and dredging by the Corps of Engineers back around the turn of the century, formed a shallow series of side channels, ponds, and lakes (Bell, 1905). As the main channel of the Cache River was then very ill-defined, this locality soon became known to the early settlers of the region as the "scatters," a name by which it is still known today.

Although much of the basin of the Cache River system has seen some ecological disturbance, a small portion of the original "scatters" area remains as relatively untouched. This area is best seen at the bridge crossing of State Highway 37 over the Cache River, this located but one mile north of the junction of this road with State Highway 169. Here, providing the season is mid-summer and the ground by that time dried out, one may view without special hardship the largest individuals of Drummond's red maple and water tupelo in the United States, as well as the largest specimens of baldcypress, pumpkin ash, planertree, and swamp oak in the State of Illinois!

DESCRIPTION OF THE CHAMPION BIG TREES

The following descriptions of the big trees of the Karnak area, with the exception of one, the swamp oak (the dimensions of which have been published elsewhere; see Koelling, 1976), are based upon original measurements and data collected by the authors over the course of several field trips to the area. Circumferences were measured at breast height (4 1/2 ft.), and tree heights were determined with the aid of a "Haga" brand altimeter.

Drummond's Red Maple (*Acer rubrum* var. *drummondii* (H. & A.) Sarg.)--The largest currently known United States specimen of this species grows in the floodplains of the lower Cache River near Karnak, Illinois. It is found in the vicinity of the highway bridge, a short distance off the west side of the road. This very massive tree (see Fig. 1) forks about ten feet from the ground, and has several side branches which originate about the base. Its circumference is 16 ft. 2 inches; while the average spread of its canopy and its height are respectively 85 and 135 feet.

One of the lower branches of this huge maple tree originates near ground level, and runs parallel and fused to the trunk for a distance of four feet before diverging. This side branch, which measures over a foot and a half in diameter, is not included in the above circumference measurement. Had there not been a narrow space between this branch and the trunk of the tree so as to permit a measurement at the standard breast height level, the tape would have indicated a combined circumference of 18 ft. 3 inches.

Ornamenting the lower trunk of this big maple tree, beginning some ten feet above ground and running some five feet downwards, is a huge gall-like growth. This tumorous structure, which is clearly visible in Fig. 1, is a foot and a half thick in places.

By way of comparison, the largest Drummond's red maple previously reported for the State of Illinois has a circumference, height and spread of 11 ft. 7 in., 90 ft., and 73 ft., respectively; while the AFA's National Register lists a Missouri tree with corresponding measurements of 10 ft. 1 in., 99 ft., and 62 feet (Pardo, 1978).

Also of some interest here is the fact that the largest Illinois specimen of the typical variety of the red maple (Acer rubrum L., var. rubrum) grows only 30 miles north of the present locality. According to Koelling (1976), this tree, which is located on the Crab Orchard Wildlife Refuge in Williamson County, measures 13 ft. 10 in. in circumference, 72 ft. in height, and 73 ft. in spread. The national champion of this variety, however, occurs near Armada, Michigan. The AFA's National Register reports that it has a circumference of 16 ft. 3 in., and a height and spread of 125 and 108 ft., respectively. Our champion Drummond's red maple, however, compares very favorably with this national record for the typical variety.

In addition to the above champion Drummond's red maple, a number of other smaller, but still rather sizable individuals of this species are to be found in the alluvial plains of the Cache River near Karnak. The authors, for example, located one tree with a circumference of 11 ft. 7 in. at breast height, and yet another with a circumference of 14 ft. 4 inches. One rather large but abnormally developed individual of this species had a cluster of trunk-like prop roots extending upwards some eight feet above the ground, from which point the main trunk finally emerged. Prop roots and buttressed trunks, however, while apparently rare in maple, are not uncommon in certain other species groups where the plants are subjected to periodic floodings.

Pumpkin Ash (Fraxinus profunda (Bush) Bush).--The largest known Illinois specimen of this tree grows within 150 feet of the big maple described above. This is a 97 ft. tall, straight-growing tree with a circumference of 11 ft. 1 1/2 inches, and an average spread of 56 feet (Fig. 2). The largest previously described Illinois specimen of this species was reported from a locality but five miles northeast of the present one (near the town of Cypress, vide Koelling, 1976). This latter tree is said to be 90 ft. tall, with a circumference of 6 ft. 6 in., and a spread of 35 feet.

In contrast to our Illinois trees, the largest member of this species in the United States, as reported by AFA's National Register, is an 86 ft. tall Virginia tree. This eastern champion measures 18 ft. 3 in. in circumference and has a spread of 84 feet. However, our two Illinois trees, standing at 90 and 97 feet, are taller!

Specimens of pumpkin ash are not nearly as frequently met with in the Karnak swamp area as are specimens of water tupelo, cypress, and Drummond's red maple, which assume dominance in that order. Moreover, no seed reproduction of pumpkin ash was noted in the areas where they do occur.

Water Tupelo (Nyssa aquatica L.).--The largest known Illinois specimen of this species stands but a short distance off the east lane of Highway 37, near the Cache River bridge. This peculiarly formed tree (see Fig. 3) has a circumference of 26 ft. 7 in., and a height and spread of respectively 81 and 35 feet. According to Southern Illinois University ecologist, Dr. Philip A. Robertson, the several slender upper trunks of this plant may have developed originally as sprouts from along the rim of an older broken trunk.

If true, the original bole probably reached skyward to a much greater height than it does today. In any event, the huge base of this plant is hollow and forms a chamber 15 ft. long and 9 ft. 5 in. wide at ground level, and over 6 ft. high at the center. The "walls" of this room, being only 6 to 8 inches thick in most places, are remarkably thin for the size of the upper plant which they support.

A second water tupelo tree at this location also deserves mention (see Fig. 4). This is a single bole, normally developed tree measuring 22 ft. 5 in. in circumference, with a height and canopy spread of 118 ft. and 65 ft., respectively. Though the trunk of this tree is smaller in circumference than the first big water tupelo mentioned, this plant nevertheless exceeds all previously published reports for this species in so far as plant height and canopy spread are concerned, and is therefore another national record. Like the first tree mentioned above, this one is also hollow at the base. Its interior cavity, which measures some 8 ft. 6 in. in diameter at the soil line, is entered via an inverted V-shaped opening in the base of the trunk, this measuring some 5 ft. wide at ground level. This inner cavity extends upward some 40 ft. to the height of the first branch, and daylight can be seen breaking through a small hole which pierces the trunk at the elevation.

The largest previously reported Illinois specimen of the water tupelo comes from a locality just east of the town of Cypress in Johnson County, an area only 4.5 miles north of the present one. According to Koelling (1976), this is an 80 ft. tall tree having a circumference of 7 ft. 4 in. and an average spread of 35 feet. In contrast, the largest tree of this species in the United States (located near Kinder, Louisiana) has a height of 105 ft., a circumference of 27 ft. 1 in., and a spread of 58 ft. (Pardo, 1978; Behlen, 1980). Our first mentioned big Illinois water tupelo tree, you will note, lacks only 6 inches to rival the current national champion of this species in circumference!

Planertree (*Planera aquatica* Gmel.)--Although remaining as a small tree throughout its range, this species, which is sometimes called "water elm," attains rather impressive proportions in the swamps near Karnak (Fig. 5). Here, one large individual in the near vicinity of the second big water tupelos mentioned above has a circumference of 4 ft. 6 in., a height of 51 ft., and a spread of 48 ft. 6 inches. The largest previously reported Illinois specimen of this species comes from Ft. Massac State Park in Massac County, the latter locality situated about 20 miles SE of the present area. This tree is recorded to have a circumference of 3 ft. 10 in., a height of 40 ft., and a spread of 18 feet.

Planertree is rather rare in Illinois, being known principally from the banks of the Cache River in Pulaski, Johnson, Massac, and Alexander Counties. However, it is also reported by Mohlenbrock (1972) as occurring in Pope County.

The largest known specimen of planertree in the United States occurs in Gadsden Co., Florida. This tree, according to the National Register, is 8 ft. 4 in. in circumference, 77 ft. tall, and has a spread of 47 feet.

Baldcypress (*Taxodium distichum* (L.) Rich.)-- In the near vicinity of the planertree and big water tupelos mentioned above occurs the state's largest known example of this species (Fig. 6). This swamp giant is found about 200 yards, from the road, and about half that distance to the river banks. It is 26 ft. 7 in. in circumference, 103 ft. tall but broken at the summit, and has an average spread of 40 feet. It is surrounded by numerous huge "knees," the largest of which is 7 ft. 9 in. tall, with a circumference of 9 ft. 1 in. at the base. Only one other Illinois tree is known to have a circumference greater than this one, and that is an eastern cottonwood from the northeastern part of the state (Grundy Co.) with a girth of 27 ft. 4 inches (Koelling, 1976).

A number of other very large specimens of baldcypress are also found at this locality. The authors, for example, measured seven trees in this area which had a circumference, of 16 ft. or over. Four of these were over 19 ft. in circumference, while the larger of these lesser giants measured 21 ft. 10 inches.

Damage to the big cypress trees of this area has occurred primarily through the agency of fire, disease, logging, and vandalism associated with the cutting of "knees," the latter probably sold to curiosity shops or used in the manufacture of lamp bases. Some of the big cypress trees have been "topped" by lightning; others, still living, show charred streaks running down to the base of the trunk; and still others stand as skeletons of dead wood, mute testimony to the thunderous storms which, in the past, have been known to shake this area. Several of the big trees studied by the authors had large cancerous growths covering portions of the lower trunks. While similar-appearing tumors were also observed to infect occasional individuals of water tupelo and Drummond's red maple, the nature of this disease, as well as its affect upon the longevity of the plant, needs to be investigated.

According to the National Register of Big Trees, there are two individuals of this species which qualify for the title of co-champion. One is a North Carolina plant with a circumference of 38 ft. 3 in., and a height and spread of 138 ft. and 36 ft. while the second, the "Tennessee Titan," has a circumference of 39 ft. 8 in., and a height and spread of 122 ft. and 47 ft. respectively.

It may be of some interest here that the largest cypress tree in the world is a Montezuma Cypress (*Taxodium mucronatum*) (Ten.). It is found near Mitla in Southern Mexico and has a diameter of 50 feet. However, some claim that the trunk of this very massive tree, the age of which is reputed to be 5000 years (Chamberlain, 1932), is actually made up of three smaller trees which have become fused into one.

Swamp Chestnut Oak (*Quercus michauxii* Nutt.).-- The largest known Illinois specimen of this species is found along the north bank of the Cache River, opposite the town of Karnak. This slightly disjunct locale, which lies four miles due east (map distance) of the Highway 37 river bridge, is in Johnson County, but forms a continuation of the "scatters" area which was previously described. The tree known from here is 94 ft. tall with a girth of 18 ft. 4 in. and a spread of 124 feet (Koelling, 1976, updated sheet). The 122 ft. tall national champion of this species, which is found in Talbot County, Maryland, has a girth of 22 ft. 7 in., and a spread of 123 ft.

Other Species.-- Although not of record proportions, many other big trees of various species are found in the swamplands of the Cache River basin near Karnak, Illinois. The authors, for example, in the course of their investigations, determined the maximum circumferences of other important bottomland species of the area as follows: American elm, 9 ft. 11 in.; black willow, 7 ft. 4 in.; eastern cottonwood, 11 ft. 2 in.; river birch, 7 ft. 0 in.; sugarberry, 5 ft. 2 in.; sweetgum, 8 ft. 3 in.; and water hickory, 5 ft. 2 inches. One green ash measured by the authors, with a circumference of 10 ft. 5 in., height 137 ft., and a spread of 60 ft., came close to being a state record.

CLIMATIC AND EDAPHIC CONSIDERATIONS

The larger territory where the above trees grow, the southernmost counties of Illinois, is a region of gently rolling hills that are covered by a rather thick mantle of loess (the latter, a wind-blown dust deposited during glacial times). Elevations in this part of the state range from 340 to 450 feet. Underlying these hills are deposits of unconsolidated sand, gravel, and clay, all materials brought in or laid down when this particular part of the state lie at the very foot of the enormous Gulf of Mexico embayment during Cretaceous and Tertiary times. The remaining landforms in this area consist of some rather broad alluvial plains and terraces bordering the Mississippi, Ohio, and Cache Rivers (Parks & Fehrenbacher, 1968).

According to the USDA Soil Survey Book of Pulaski and Alexander Counties, the alluvial land in the big tree area is classified as "Karnak Silty Clay, Wet." This is a light-colored, poorly drained soil formed of sediments measuring more than 50 inches thick. Moreover, the survey reports that the Karnak soils are ". . . slightly to strongly acid; very slowly permeable; and the water table is close to the surface of the ground during much of the year, with flooding occurring in the spring." Our own tests of soil taken from the vicinity of the big trees of this area indicate pH range of 4.0 to 4.2.

With respect to its climate, the area is noteworthy for its short and rather mild winters. The average January temperature at Cairo, the closest recording station (2.2 miles to the south), is 37.5°F, while the average July temperature is 81°F. Rainfall averages 45.2 inches per year, and the average length of the growing season is about 208 days (Parks & Fehrenbacher, 1968).

Whether or not the above environmental conditions are truly optimal ones for the growth and development of the big tree species taken into consideration here, or whether other matters need be taken into account, is a question which may be of some interest, if not practical concern, to foresters, ecologists, and plant geographers alike. In this connection, it is interesting to note that with respect to the overall continental distributions of the big tree species of the Karnak area, all are situated at or very near the northernmost boundary of their respective species' ranges. A similar phenomenon was noted by the two phytogeographers, Meentemeyer and Elton (1978), who plotted the distribution of big tree champions reported for Eastern North America in the National Register. In this latter case, the majority of the big trees occurred in the far northern sectors of their respective species' ranges, where climatic conditions, as deduced from the far greater frequency of occurrence of the species in other portions of their range, would not appear to be especially favorable. In an effort to shed more light on this particular problem, the above authors undertook a graphical analysis of those environmental factors which were deemed by them to be most instrumental in the growth and development of large plants. Thus, they chose to plot an index of potential evaporation-transpiration (PE) by one of moisture to obtain a comparative picture of solar energy and precipitation at each big tree site. These authors discovered, much to their surprise, that the big trees occurred mostly in the cooler and drier portions of their overall respective species ranges, in areas or latitudes where solar radiation was mostly at a minimal value.

Although Meentemeyer and Elton were seemingly at a loss to explain the occurrence of these national-champion big trees in areas of the country where climatic conditions would appear today to be less than ideal for the growth and propagation of the species as a whole, it must be remembered that the trees in question are, in many cases, ones which are very old (500 to 1200 years, or more in certain cases; see Fowells, 1965), and that the climate of the various small locales which are involved, far from being the kind of constant or unchanging factor that it was implicated to be by the above authors, has in reality changed markedly in the intervening years. Thus, the evidence from fossil pollen grains, from tree rings, and from other sources all suggest that the world was much

warmer six hundred to two-thousand years ago than it is today. Dolf (1960), for example, reports that Norsemen settled Greenland a thousand years ago, raising many head of cattle on what is now permanently frozen land. He also states that glaciers in Iceland were far less extensive from 900 to 1300 A.D. than they are today. Similarly, Sauer (1965) reports that many European tree species grew much farther north a thousand years ago than they do today. The past 600 years or so, however, has seen much change. According to Spurr (1964), a period of increasing cold set in about 1300 which culminated about 1800. The latter change was responsible for the shifting of many tree species ranges in a southerly direction in both Europe and the United States.

Assuming that the above sequence of climatic events is correct, and we have no reason to believe otherwise, then it would seem quite possible that many tree species ranged much farther north in Eastern North American during pre-Columbian and pre-Renaissance times than is the case today. If so, Southern Illinois, far from representing the northernmost outlier of the great cypress-tupelo coastal swamp as it does today, may have been closer to the geographic center of this formation, and thus closer to the area where optimal climatic conditions may be inferred to exist. This would mean, in essence, that our big Illinois trees sprouted and developed in an era when the climate of the state was much more favorable to swampland formation than it would appear to be today. When climate eventually changes (that is became cooler and drier), cypress swamps ranging north of the present ones became extinct. Thus, our large swamp trees of Southern Illinois would appear to stand as relics of a bygone era, an era when higher temperatures and greater precipitation prevailed throughout an area extending perhaps several hundreds miles north of the present cypress swamps.

Palmer (1921), who also argues that the big swamp trees of Southern Illinois may be relics of a once more-northerly distributed plant formation, suggests there may have been continuous survival of southern swamp species in the Cairo district from the time of the great Mississippi embayment in the Cretaceous Geologic Period all the way to the present time. With the uplift of the Ozark plateau and the obliteration of the Mississippi embayment in late Tertiary times, the swamp flora north of the present study area may have become extinct, while the emerging land of the embayment area received the influx of species migrating southwards from the Cairo area, which at that time stood at the edge of the retreating gulf waters. While Southern Illinois may thus be looked upon as a center of dispersal for southern swamp species back in the Tertiary, it is obvious to us that Palmer overlooked the influence of the great ice sheets which swept across the state on several different occasions at a

still later period, during Pleistocene times. Each advance of the ice had the effect of displacing plant formations in a southerly direction (Cain, 1971). Hence, it would appear to us as rather doubtful whether the cypress-tupelo swamps of Southern Illinois could have existed so close to the leading edge of the ice, which in some places was no more than 42 miles north of Cairo, or less than 20 miles north of the Karnak big tree area (Horberg, 1957). More likely, the present trees of the area are survivors of later migrations, especially during the period of the "climatic optimum" (Sauer, 1965) which followed the demise of the last glaciation.

DISTRIBUTION, HABITAT AND PROPAGATION OF THE SWAMP TREES

Although apparently shrinking in distribution during modern times, the present range extent of cypress-tupelo swamp in the United States is nonetheless impressive. This uniquely American swamp formation, endemic to the southern and central regions of the United States, extends over 2700 miles along the margins of the Coastal Plain from southern Delaware to south Florida, and west through southeastern Texas almost to the Mexican border. Inland, in the Coastal Plain, cypress swamp occurs along the many streams of the Southeastern States, and then ranges northward along the Mississippi River and its many large and small tributaries until it reaches southern Illinois and southern Indiana, where the northern range of this widely distributed formation finally terminates.

In Southern Illinois, cypress swamp occurs primarily in the river bottoms of the Mississippi near McClure; the backwaters of the Ohio; and the Cache River bottoms near Karnak, where the finest remaining stands of this formation occur today.

Teford (1926) reports that the original extent of coverage of cypress forests in Illinois before drainage activities were begun was in the neighborhood of 250,000 acres. Today, as a result of the logging and the subsequent drainage of these swamps for agriculture, only very few, small, and scattered remnants of this formation remain, these to be found largely in Alexander, Pulaski, Massac, Union, and Johnson Counties (Anderson and White, 1970).

Although the flora of the swampland formation is best preserved in the "scatters" region of the Cache River basin near Karnak, Illinois, this area in the past has received very little publicity, and has therefore been very little visited by either the public or the scientific community at large. Thus, few naturalists or others interested in the botanical sciences have had opportunities to collect the interesting and rather varied plant life of this area, and still fewer have actually written of its flora.

One of the earliest reports of the region appears in the record of the Public Land Survey, the report of which covers the years 1806 to 1809. Included within this report as well as in the notes of a somewhat later one (Bell, 1905) are descriptions of the potentially valuable timber trees of the area; the important undergrowth species; the location, dimensions and bearings of "witness trees" used in the establishment of section corners; and the distribution of different soils.

In 1919, the botanist Ernest J. Palmer visited Pulaski County and made a number of rather extensive plant collections from swamps located in the vicinity of Mounds City and Cairo, but as his published report (1922) of the expedition makes no mention of the "scatters" near Karnak, it would appear likely that he was not even aware of this area's existence.

To date, the only scientific collections of plants from the "scatters" region that are available for study, other than those which have been assembled with our own effects, consists of some dozen specimens of various species collected by William M. Bailey and Julius R. Swayne during brief forays to the area in 1947, 1950 and 1952; and a similar number that was collected by botanist R. A. Evers in 1948 and 1952.

As far as the floristic composition of the "scatters" is concerned, our habitat list of the species of this area includes the following trees: Drummond's red maple (Acer rubrum var. drummondii), river birch (Betula nigra), American hornbeam (Carpinus caroliniana), water hickory (Carya aquatica), big shellbark hickory (C. laciniosa), sugarberry (Celtis laevigata), swamp privet (Forrestiera acuminata), green ash (Fraxinus pennsylvanica var. subintegerrima), pumpkin ash (F. profunda), water locust (Gleditsia aquatica), swamp holly (Ilex decidua), sweet gum (Liquidambar styraciflua), water tupelo (Nyssa aquatica), planertree (Planera aquatica), eastern cottonwood (Populus deltoides), swamp cottonwood (P. heterophylla), overcup oak (Quercus lyrata), swamp chestnut oak (Q. michauxii), chestnut oak (Q. prinus), black willow (Salix nigra), baldcypress (Taxodium distichum), and American elm (Ulmus americana).

Also associated with the swamp trees cited above are a number of shrubs and woody vines. Characteristic shrubs of the "scatters" area include button bush (Cephalanthus occidentalis), swamp rose (Rosa palustris), and silky willow (Salix sericea), while the only vines of the deep swamp are buckwheat vine (Brunnichia cirrhosa), trumpet creeper (Campsis radicans), poison ivy (Rhus radicans), climbing dogbane (Trachelospermum difforme), and catbird grape (Vitis palmata).

Few herbaceous plants are found in the swamp, largely because the area is flooded with several feet of water each spring. However, scattered individuals and occasional colonies of the following plants are to be found here: copper leaf (Acalypha rhomboidea), swamp milkweed (Asclepias perennis), bur-marigold (Bidens discoidea), bog hemp (Boehmeria cylindrica), dodder (Cuscuta cuspidata), turnsole (Heliotropium indicum), catchfly grass (Leersia lenticularis), whitegrass (Leersia virginica), water-horehound (Lycopus rubellus), Lizard's tail (Saururus cernuus), and marsh St. John's wort (Triadenum tubulosum).

Plants of the dense roadside thickets, which, in places, all but obscure one's sight of the big trees of this area, include: box elder (Acer negundo), giant ragweed (Ambrosia trifida), nodding spurge (Euphorbia maculata), spotted touch-me-not (Impatiens biflora), evening primrose (Oenothera biennis), smooth paspalum (Paspalum laeve), dock-leaved knotweed (Polygonum lapathifolium), false dandelion (Pyrrhoppappus carolinianus), wild blackberry (Rubus sp.), foxtail grass (Setaria glauca), bur cucumber (Sicyos angulatus), Johnson grass (Sorghum halepense), smooth buttonweed (Spermacoce glabra), hedge parsley (Torilis japonica), and redtop grass (Triodia flava). In addition to the above, water hemlock (Cicuta maculata) and halberd-leaved rose mallow (Hibiscus militaris) grow in the wet roadside ditches of the area.

In so far as ecological plant succession in the swamp is concerned, the overriding consideration here would appear to apply to the rate of reproduction of the water tupelo, Nyssa aquatic. A rather uniform, though spacially discontinuous understory of plants of this species, averaging about five feet in height, has become established in the Karnak big tree area, suggesting that the future forest of the Cache River bottoms will be predominantly of this species. Although annual seed reproduction of cypress and other trees also occurs in this area, the small seedlings of these species (usually only 8-10 inches high by the end of the first growing season) are totally inundated and eradicated by the floodwaters which rise early each spring.

In this connection, it is interesting to note that the main requirement for germination of cypress seeds, according to Fowells (1965), is an abundant supply of moisture for a period of one to three months. Following the germination of the seed, the plants must necessarily grow tall enough the first year to stay above the floodwaters of the following spring. While the rate of growth of water tupelo seedlings appear to fulfill this requirement, those of the cypress and other tree species of the area presently do not. However, it should be noted that current water levels in the area are much higher than they were in days past, this due largely to the construction of dams downstream. If these were removed, reproduction of the species in this area would probably continue as in days past.

VALUE AS A POTENTIAL SCIENTIFIC AREA

As a geographic region, Southern Illinois stands out as one of the few areas of the state where very many champion trees have been reported. The current Illinois listing of big trees, for example, cites 44 record-holders for the area bounded by the sixteen southernmost counties of the state. These champions can all be seen within a radius of 50 miles from the Karnak swamp station. Moreover, in contrast to the many official records of "big trees" that have been cited for the extreme northeastern counties of the state, the great majority of our "big trees" are ones which are genuinely very large. These represent, for the most part, neither introduced varieties nor horticultural forms, but wild species which are indigenous to particular natural areas. Thus, far from arising as an artifact of the species distribution within the state, our records would appear instead to be much more indicative of the actual level of development of the forests of our region during presettlement times.

Though at one time undoubtedly growing in close association with other large trees, our official champion big trees of Southern Illinois stand today largely as lone individuals in areas where the original forest has been cut down, freeing the land for agriculture, urban expansion, or the regrowth of the same or different forest trees. Nowhere within this formerly well developed center of species diversity and optimal tree growth do we find any suggestion of what the presettlement vegetation of the land appeared like, except, perhaps, in the case of the presently described "scatters" district of Pulaski County and the more widely publicized and botanically better known swamps of the Horseshoe Lake area, the latter located some 20 miles to the SW in Alexander County (cf. Koelling, 1968). Significantly, within each of the above areas are to be found local associations of very old trees, quite a few of which approach record-size proportions.

Unlike the swamplands of the Horseshoe Lake area, which presently fall under protection of the Illinois Department of Conservation, the "scatters" region of the Cache River still needs to be set aside for the purpose of scientific study, as well as for the enjoyment of future generations. Signs of the gradual erosion of this swampland are everywhere. Water-levels in recent years are much higher than they were in years past, this due to the construction of dams downstream and the logging and drainage of much of the watershed for agricultural purposes. Moreover, unless some effort is made to preserve this land soon, the remaining small acreage of swampland along the lower Cache River, all of which is in private hands, will soon follow in the wake of the passenger pigeon.

As to the future of this area, we cannot but help agree with Mr. Max D. Hutchinson of the Illinois Nature Preserves Commission, who, in a privately printed and distributed circular (1979) concerning this swampland writes:

"The threats of logging and land clearing are real. Farming in the adjoining crop fields is continuing to dump more silt and chemical pollutants into the drainage ditches which flow into the area. The landowners must be informed and convinced that this is truly a significant natural area deserving of protection; that it is worth more than the profit from thousands of acres of marginal farmland in the area."

Today, a group of concerned individuals who reside in the near vicinity of the swamps has formed a "Citizens Committee to Save the Cache." This group, under the able leadership of Mr. Neal Needham of Dongola, has been actively seeking outside support for their one major goal--the preservation of the "scatters" area. As scientists, we can concur with their recommendation that this land be bought up by the state, or by one of the several private conservation agencies, and be permanently set aside for the use and pleasure of our children and our "children's children."

LITERATURE CITED

- Anderson, R.C. and J. White. 1970. A cypress swamp outlier in Southern Illinois. Trans. Ill. Acad. Sci. 63(1):6-12.
- Behlen, D. 1980. Supplement to the national register of big trees. Am. Forests 86(4):11-16.
- Bell, A.H. 1905. Report of chief engineer, Cache River Drainage Commission, in Report of Board of Cache River Drainage Comm. of Ill., Ill. Printing Co., Danville.
- Braun, E.L. 1950. Deciduous Forests of Eastern North America. Hafner Publ. Co., N.Y. 596 pp.
- Cain, S.A. 1971. Foundations of Plant Geography. Hafner Publ. Co., N.Y. 556 pp.
- Chamberlain, C.J. 1932. The age and size of plants. Sci. Monthly 35:481-491.
- Dolf, E. 1960. Climatic changes of the past and present. Am. Sci. 48(3):341-364.
- Fowells, H.A. 1965. Silvics of Forest Trees of the United States. U.S.D.A. Handbook NO. 271, 762 pp.
- Horberg, L. 1957. Map of bedrock surface of Illinois. Published by State Geological Survey, Urbana.
- Horrell, C.W., H.D. Piper, and J.W. Voigt. 1973. Land Between the Rivers. Southern Illinois Univeristy Press, Carbondale, 207 pp.
- Hutchinson, M.D. 1979. The natural character of the "scatters" region along lower Cache River in Johnson and Pulaski Counties. A five page xerox handout distributed by the "Citizens Committee to Save the Cache, "Mr. Neal Needham, President, P.O. Box 21, Dongola, IL.
- Koelling, A. 1968. The plant community at Horseshoe Lake. The Living Museum 30:36-39. Ill. State Museum, Springfield.
- _____. 1976. Illinois big tree champions. List issued by Ill. Div. of Forestry, Springfield.
- Meentemeyer, V. and W.M. Elton. 1978. Blueprint for big trees. Am Forests 84(4):9-10; 58-60.
- Mohlenbrock, R.H. 1972. Forest Trees of Illinois. Ill Dept. of Conservation, Div. of Forestry. 328 pp.
- Palmer, E.J. 1921. A botanical reconnaissance of Southern Illinois. Gray Herbarium; J. Arn. Arb. 21:29-153.

- Pardo, R. 1978. National register of big trees. Am. Forests 84(4):17-47.
- Parks, W.D. and J.B. Fehrenbacher. 1968. Soil Survey of Pulaski and Alexander Counties, Illinois. U.S.D.A. Soil Conservation Service in cooperation with Ill. Agric. Exp. Sta., Report No. 85.
- Sauer, C.O. 1965. Land and Life. Ed. John Leighly, Univ. of Calif. Press, Berkeley and Los Angeles, 435 pp.
- Spurr, S.H. 1964. Forest Ecology. The Ronald Press, N.Y. 352 pp.
- Telford, C. 1926. Third report on a forest survey of Illinois. Nat. Hist. Survey Bull. 16:1-102.
- Vestal, A.G. 1931. A preliminary vegetation map of Illinois. Trans. Ill. Acad. Sci. 23:204-217.



Fig. 1. The tape held by Dr. Donald Ugent confirms an earlier measurement of 16 feet 2 inches in circumference for this record-breaking specimen of Drummond's red maple. Note the huge gall which has formed on the trunk of this tree. These growths appear to be common on nearly all of the very oldest plants of this swampland.



Fig. 2. A source of pride for Illinois residents, this pumpkin ash, as remeasured by Michael Mibb checks out at 11 feet 1 1/2 inches.



Fig. 3. Awaiting visitors, as Dr. Donald Tindall (left) and Michael Mibb would testify, the base of this peculiarly-formed water tupelo is hollow and forms an interior chamber 15 feet long and 9 feet 5 inches wide at ground level.



Fig. 4. Standing at 118 feet, this massive water tupelo is the tallest known individual of its kind in the country. The inner diameter at ground level of the cavity behind Dr. Ugent is 8 feet 6 inches.



Fig. 5. The circumference of this champion Illinois planer-tree, as verified by Dr. Ugent, is 4 feet 6 inches.



Fig. 6. Surrounded by numerous large and small "knees", this very huge baldcypress tree presents rather a spectacular sight to the casual swamp visitor.